NASA TECH BRIEF

Marshall Space Flight Center

Explosive Cord

An explosive cord developed for use on large space vehicles to cut or sever straps, bolts, rings, and supports has been made available to the commercial market. The explosive device, jetcord, is basically a metal-clad linear explosive as opposed to clothclad explosives such as primacord. Different sheathing and explosive materials are required for the many applications of the explosive cord, lead being the material most frequently used for the smaller jetcords. Aluminum, silver, and copper are also used, and most of the explosive cords are sufficiently flexible to allow forming into intricate shapes.

One commercial version of the jetcord consists of a suitcase-sized explosive apparatus. It is intended to blow a hole in the surface on which it is placed. This version is capable of making a hole through 20 cm (8 in) of concrete, 12 cm (5 in) of macadam, and 1.6 cm (5/8 in) of steel. The explosive phenomenon known as the Munroe effect, in which the interaction of the detonation products and the cavity liner material emanates at high velocity from a shaped charge, is efficiently employed in the system. Typically, if a length of jetcord is detonated on a metal witness plate, the jet exerts a force of several million pounds per square inch along a very narrow line. This force causes the metal to be pushed out of the way of the advancing jet by plastic flow. The resulting groove is commonly termed "penetration." On a thin plate, however, the performance of jet cord depends not only upon the cavity liner material and the intense, directed shock waves to erode the target, but also upon the rapidly expanding gases to physically dislocate and fracture it. The shock waves, when reflected from the surface opposite the cut, can cause spalling from that surface. The total effect is termed "cutting," with jetcord consistently "cutting" a target of greater thickness than can be "penetrated."

Notes:

1. Information concerning this innovation may be of interest to those engaged in sheet metal work, specialized salvage and demolition projects, pipe cutting, and fire-fighting.
2. Requests for further information may be directed to:
   Technology Utilization Officer
   Marshall Space Flight Center
   Code A&TS-TU
   Huntsville, Alabama 35812
   Reference: B72-10293

Patent status:

No patent action is contemplated by NASA.

Source: The Explosive Technology Company
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